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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,145	03/14/2001	Barret May	P 278093 N00/0141/US	2386

909 7590 02/13/2003
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EXAMINER

KALAFUT, STEPHEN J

ART UNIT	PAPER NUMBER
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1745

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DATE MAILED: 02/13/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/805,145

Applicant(s)

MAY ET AL.

Examiner

Stephen J. Kalafut

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-45 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 18, 20-37 and 39-45 is/are rejected.
- 7) ☒ Claim(s) 17, 19 and 38 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3, 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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Claims 14, 21, 22, 26, 28 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. There is no antecedent for "the surface features" in claim 14, or its parent claim 1. Is dependency on claim 13 intended? Likewise, there is no antecedent for "the pipework" in claim 26. Is dependency on claim 25 intended? There is also no antecedent for "the inlet and outlet apertures" in claims 28 and 29. Is dependency on claim 11 intended? Claim 21 recites "further" fluid apertures. This is confusing because neither this claim nor its parent claim 1 recites any "first" set of such apertures. Claim 22 recites that the plate has a monolithic structure, but this would be inconsistent with parent claim 1, which recites that the plate includes a coating. Thus, the plate must be composite rather than monolithic.

Claim 23 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. This claim recites that the plate has a composite structure, which is redundant since the plate of parent claim 1 includes a coating, and thus must be composite. Thus, this claim only recites a limitation already inherent to its parent.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

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(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

Claims 1, 2, 4-6, 8-10, 20, 23, 27, 31-36 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Bett *et al.* (US 5,840,414).

Bett *et al.* disclose a solid polymer electrolyte fuel cell (column 4, lines 51-54) which includes a plate (4) which is made of carbon coated with a metal oxide such as RuO₂, SnO₂, Ta₂O₅, TiO₂, or mixtures thereof (column 3, lines 54-66). For claims which recite the plate per se, the recitations of intended use, "end plate", "separator plate" or "current collector plate" would not distinguish, although the last two of these three uses would be met in any event, since the plate (4) of Bett *et al.* is disclosed between two adjacent fuel cells. Since the plate (4) includes plural layers and plural materials, it would have a composite structure. Bett *et al.* also disclose a stack of fuel cells (figure 2), in which some of the separator plates (4) include the present metal oxide coating, while others (13) do not, as well as coolant water channels (15).

Claims 1-5, 7, 15, 16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Dowell (US 4,000,346).

Dowell discloses a multilayer device which includes a coating of mainly ruthenium and/or iridium oxides, and may also include oxides of rhodium, osmium, titanium and tantalum. Iridium, rhodium and osmium are group 8 metals. See column 5, lines 4-27. Referring to earlier art, Dowell also discloses electrodes of Ti or Ta coated by films RuO₂ (column 1, lines 22-26).

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Since these coatings are described as films (column 1, line 23, column 2, lines 10-14), the overall structures would be flat, and would thus be plates. Since these claims recite a plate *per se*, recitations of intended use would not distinguish.

Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated by Sizer *et al.* (US 3,607,416).

Sizer *et al.* disclose a fuel cell electrode comprising a substrate and a coating of nickel cobalt spinel (column 4, lines 8-13). The electrode has multiple layers (column 5, lines 7-10), and thus would be flat, and meet the term "plate". Since the electrode is porous (column 4, lines 49-53), it would meet the recited intended use, for "distributing fluid". Since the electrode substrate is nickel (column 5, lines 5-7), which is a conductive material, the electrode would also meet the intended use "for conducting current".

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-14, 21, 24-26, 28, 29, 37 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bett *et al.* in view of Lawrance (US 4,214,969).

Bett *et al.* do not disclose the present plate as having apertures or channels extending between them, surface features such as corrugations or a serpentine pattern, fittings for

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connection to an external circuit, or pipework to conduct fluids. These various features are disclose by Lawrance, and are shown in figure 1 (which, it is noted, looks like present figure 1). These include various apertures (16, 17, 18 and 19) for fluid flow, a corrugated flow field (9), pipework (10, 11) and connections to an external circuit (14, 15). Since these features allow the fuel cell to take in and distribute reactants, and to output electricity, it would be obvious to use the apertures, corrugated flow field, electrical connections and pipework of Lawrance in the fuel cell of Bett *et al.* Recitations of how the flow field was made, in claim 14, are treated under product-by-process practice, and are not per se given patentable weight. See MPEP 2113.

Claims 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bett *et al.* in view of Lawrance as applied to claim 11, above, and further in view of Johnson *et al.* (US 5,840,438).

This rejection is directed to claim 13 where it recites a serpentine pattern, which is not disclosed by Bett *et al.* or Lawrance. Johnson *et al.* disclose a fuel cell plate with a serpentine flow field (figure 3). Since the bends in this type of flow field would create turbulence, which would help to diffuse the reactant into the adjacent electrode, it would be obvious to use the serpentine flow field of Johnson *et al.* in the fuel cell of Bett *et al.*, as already modified to include the fluid apertures of Lawrance.

Claims 39 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bett *et al.* in view of Johnson *et al.*, both above.

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These claims differ from Bett *et al.* by reciting methanol as a reactant, and means for humidifying both reactant streams. Johnson *et al.* disclose a polymer electrolyte fuel cell which may use either hydrogen or methanol as its fuel (column 39-46). Since this is the same type of fuel cell as disclosed by Bett *et al.*, it would be obvious to use methanol as well as hydrogen, as taught by Johnson *et al.*, as the fuel in the cell of Bett *et al.* Johnson *et al.* also disclose means for humidifying both reactant streams, to prevent the polymer membranes therein from drying out (column 6, lines 45-48). Since the fuel cell of Bett *et al.* also includes polymer membranes (column 4, lines 51-52), it would also experience the problem of membrane dry out. For this reason, it would be obvious to humidify both reactant streams in the fuel cell of Bett *et al.* as taught by Johnson *et al.*

Claims 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bett *et al.* in view of Gibb (US 6,057,053).

These claims differ from Bett *et al.* by reciting various compression means at the ends of the fuel cell stack, and the relative thickness of the end plates and the separators. Gibb discloses a polymer electrolyte fuel cell stack (column 7 lines 7-19) which includes a compression assembly (column 7, lines 52-58), which may include the end plates (14) of the stack (column 8, lines 63-65). This assembly restrains the stack if it experiences an increase in internal pressure or a reduction in fuel cell thickness (column 8, lines 30-47), and thus keeps it operational. Since the fuel cell of Bett *et al.* is of the same type as that of Gibb, it would also experience these problems. To allow the fuel cell of Bett *et al.* to remain operational if it experiences an increase in internal pressure or a reduction in thickness, it would be obvious to provide it with a

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compression assembly as shown by Gibb. The relative thickness of the various plates would thus be a matter of optimization to the ordinary artisan, due to the mechanical stresses that the plates would experience during fluid pressure increase or cell thickness decrease.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The references cited by applicant, from their PCT search report, have been reviewed. Although several of these are identified with an X, only Japanese 11-126,620 discloses a fuel cell plate including a layer of RuO_2 . This *kokai*, however, is published too recently to be applicable.

Claims 17, 19 and 38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art does not disclose a plate made of aluminum or iron, or an alloy of either, coated with RuO_2 , or teach a plate coated with RuO_2 in a phosphoric acid fuel cell.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Kalafut whose telephone number is (703) 308-0433. The examiner can normally be reached on M-F 8:00-4:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (703) 308-2383. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

sjk

February 3, 2003


GROUP 1700